Moffett Federal Airfield Superfund Site

Southwest Division Naval Facilities Engineering Command

Moffett Field, California **APRIL 2001**

U.S. NAVY ANNOUNCES PROPOSED PLAN

This Proposed Plan announces the U.S. Navy's preferred cleanup remedy for the landfill at the former Naval Air Station (NAS), Moffett Field, known as Site 22. The Navy proposes to address contamination at the landfill by:

- Installing a barrier to prevent burrowing animals from disturbing the subsurface contamination
- Managing surface water flows across the site
- Enacting institutional controls to prevent excavation of waste materials
- Monitoring of groundwater and gas in the vicinity of the site

The Proposed Plan includes summaries of all the cleanup alternatives that were evaluated by the Navy, the U.S. Environmental Protection Agency (US EPA), and the other regulatory agencies, and explains the Navy's basis for offering its Preferred Alternative.

A public comment period will be held from April 2, 2001 to May 9, 2001 to receive written and oral comments on this Proposed Plan. A public meeting will be held on April 26, 2001 at the Mountain View City Council Chambers beginning at 7:00 p.m. In consultation with the regulatory agencies, the Navy may modify the Preferred Alternative or select another response action based on new information or on feedback from the community. Therefore, the community is strongly encouraged to review and comment on all the cleanup alternatives, including the Navy's preferred remedy. A final decision will not be made until all comments are considered.

DATES TO REMEMBER: MARK YOUR CALENDAR

PUBLIC COMMENT PERIOD: April 2, 2001 to May 9, 2001.
A comment period will be held from April 2, 2001 to May 9, 2001 to receive written and oral comments on this Proposed Plan. The Navy and US EPA will hold a public meeting to explain the Proposed Plan and all of the alternatives presented in the Feasibility Study. Oral and written comments on the various alternatives and the proposed remedy will also be accepted at the public meeting. A Responsiveness Summary documenting the comments received during the public comment period and public meeting, and stating the Navy's response to the comments will be prepared and sent to all of the commentors.

PUBLIC MEETING: April 26, 2001, 7:00 PM
The meeting will be held at the Mountain View City Council Chambers, City Hall Plaza Conference Room, City Hall Building, 500 Castro Street, Mountain View, CA 94041.

To view more information, visit the information repository listed below:

Mountain View Public Library
585 Franklin Street
Mountain View, CA 94041
Telephone: (650) 903-6337

To request more information or to review the Administrative Record, please contact the following:

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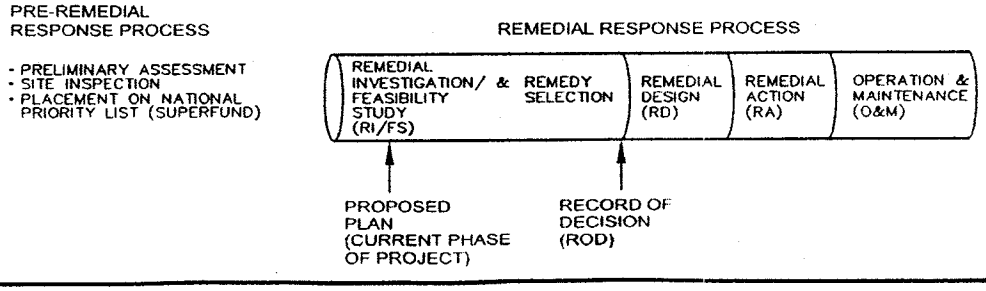
THE SUPERFUND PROCESS



The Navy is issuing this Proposed Plan as part of its public participation responsibilities under Section 300.430(f)(2) of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), also known as the "Superfund" program. This Proposed Plan summarizes information detailed in the Remedial Investigation/Feasibility Study (RI/FS) Report and other documents contained in the Administrative Record file for this site. The Navy encourages the public to review these documents to gain understanding of the site and the environmental assessment and investigation activities that have been conducted.

SITE HISTORY

The former NAS, Moffet Field, is located 35 miles south of San Francisco, 10 miles north of San Jose, and approximately 1 mile south of San Francisco Bay (Figure 1, Location Map). The facility encompasses about 2,200 acres in Santa Clara County, California. The Navy operated Moffett Field from 1933 to 1994. The facility initially supported the West Coast dirigibles (blimps) of the lighter-than-air program, and later served as a major anti-submarine/patrol airbase. NAS, Moffett Field was closed as an active military base in July 1994. The National Aeronautics and Space Administration (NASA) Ames Research Center, a research and development facility, now operates Moffett Field as Moffett Federal Airfield. The site was placed on the National Priority List (NPL) or "Superfund" in 1987. A Federal Facilities Agreement (FFA) was signed between the Navy, US EPA, RWQCB, and the California Department of Toxic Substances Control (DTSC) on September 14, 1990.

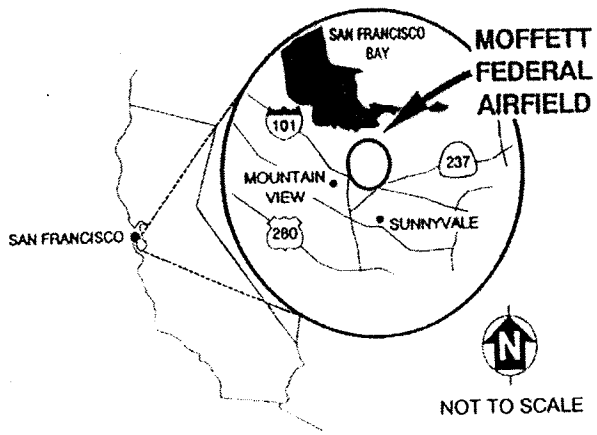


FIGURE 1: Location Map

The FFA dictates the Navy's responsibility for investigation and remediation of contamination resulting from past Navy activities. In 1984, the Navy began environmental assessments and investigations at Moffett Field. These environmental activities identified 24 sites that posed potential risks to human health and the environment.

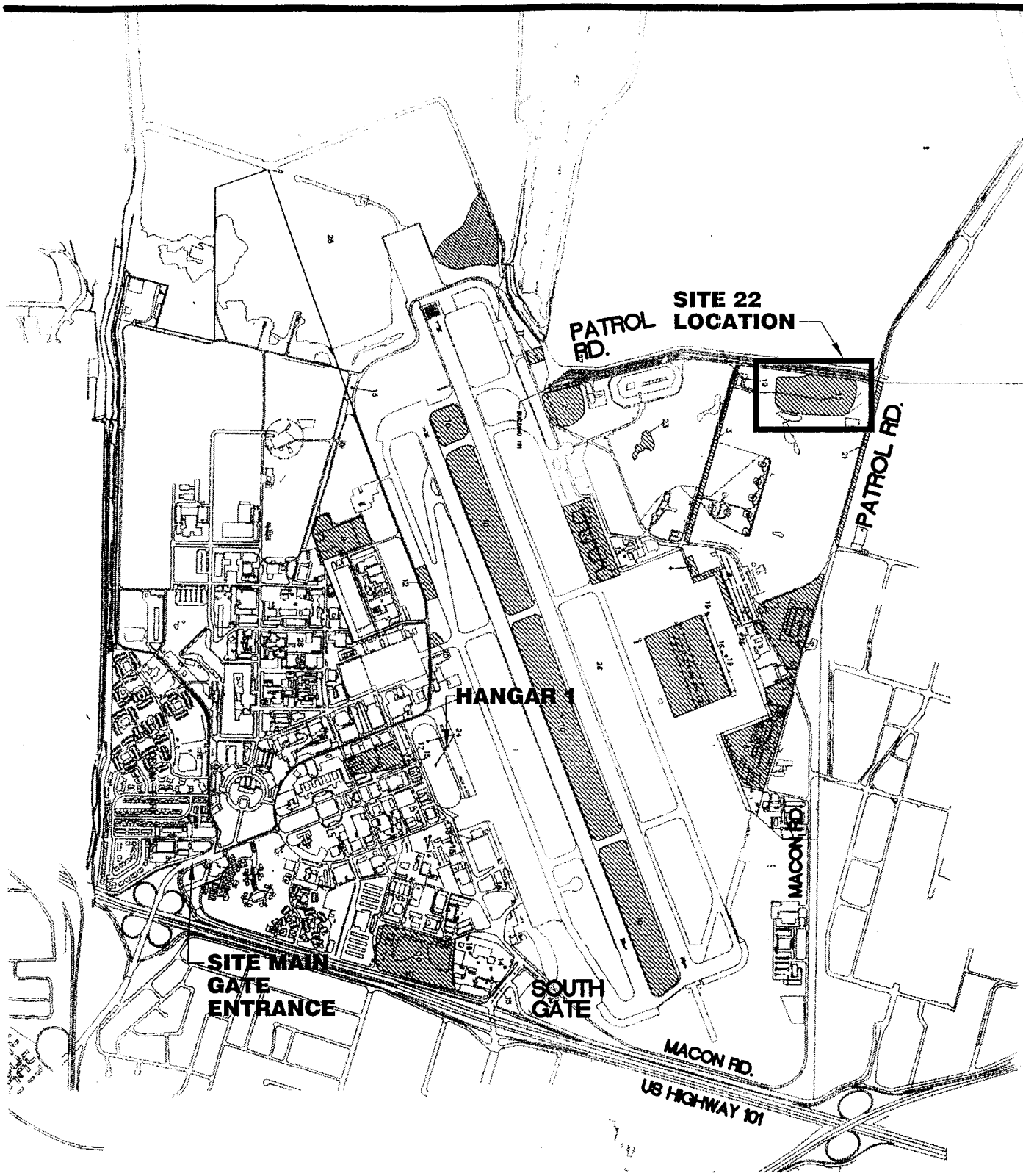
This Proposed Plan specifically pertains to the Site 22 landfill located in the northeastern corner of the Moffett Field golf course (Figure 2, Moffett Federal Airfield Site Map). The Site 22 landfill was operated from approximately 1950 to 1967, covers approximately 9.4 acres, and contains an estimated total refuse (waste) volume of 92,000 cubic yards. The refuse is believed to consist primarily of domestic waste, and this has been confirmed through exploratory trenching.

By 1973, the Site 22 landfill had been converted into holes 6 and 7 of the golf course, which is currently operated by the Air Force. Results of environmental investigations indicate that in some places the waste is located beneath the groundwater table. In addition, some of the waste is near the surface, where burrowing animals, such as ground squirrels, could uncover it, thus, creating a potential exposure risk to humans or animals at the golf course.

REMEDIAL INVESTIGATION SUMMARY

Between 1996 and 1999, the Navy conducted a remedial investigation (RI) under US EPA and the RWQCB's oversight. The RI consisted of soil and groundwater investigations around the Site 22 landfill and identified the type and extent of contaminants throughout the site. Soil and groundwater samples were collected and analyzed for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), pesticides, polychlorinated biphenyls (PCBs), total petroleum hydrocarbons (TPHs), and certain metals. The RI also included an evaluation of the potential for landfill gas buildup and migration from the site.

The RI indicated that contaminants, including VOCs, metals, SVOCs, TPH, and pesticides were detected in soil and groundwater samples collected within the Site 22 landfill.



NOT TO SCALE

FIGURE 2
MOFFETT FEDERAL AIRFIELD
SITE MAP

Information obtained during groundwater monitoring indicated that organic contaminants are not migrating away from the Site 22 landfill. In addition, metals concentrations in groundwater surrounding the Site 22 landfill are consistent with background concentrations in the area.

Furthermore, landfill gases are not escaping through surface soil or migrating away from the Site 22 landfill. Buried organic materials (such as newspapers, wood, or lawn cuttings) decompose and create methane and carbon dioxide gases. These gases can result in potentially hazardous conditions where methane and carbon dioxide can build up, potentially creating an explosive and/or oxygen deficient atmosphere. Due to this concern, the concentration of landfill gas at Site 22 was also investigated. The results of the investigation indicate that gases are not migrating to the atmosphere from the Site 22 landfill and no gases are migrating beyond the perimeter of the Site 22 landfill.

Soil beneath the Site 22 landfill consists of complex layers of fine- and coarse-grained soils. The waste is buried between 1 and 11 feet below ground surface (bgs). Approximately 5 feet of the waste is below the level of groundwater in some portions of the Site 22 landfill. Shallow groundwater beneath the Site 22 landfill is unfit to drink because of the naturally occurring elevated salt concentrations, which are similar to those in seawater.

RISK SUMMARY

The RI concluded that as long as the landfill debris remains covered (buried), there is no risk to human health or the environment. This conclusion was the result of site-specific human health and ecological risk assessments, which identified contaminants, exposure pathways, potential human and ecological receptors, and the potential risks associated with exposure to the contaminants. However, contaminated materials may be brought to the surface by animals burrowing in the area of the Site 22 landfill, where humans may then come into direct contact with the materials. This is the primary concern for the site and the focus of the response action.

Human Health Risks

US EPA has set target ranges of risk as a means of estimating the potential human health risks caused by exposure to contaminants. Risks are calculated based on the types and concentrations of contaminants present and on possible exposure pathways to these contaminants. At the Site 22 landfill, the potential exposure pathways are skin contact with soil, oral ingestion, and inhalation of soil or dust. Direct contact and ingestion of groundwater were not considered possible exposure pathways at the Site 22 landfill, since the shallow groundwater is not a drinking water source due to its high salt content. The high salt content also severely limits the use of groundwater for other beneficial purposes.

In accordance with US EPA protocols, the human health risk assessment included evaluation of both carcinogenic (cancer-causing) and non-carcinogenic risks. These risks were evaluated for three future use exposure scenarios: residential, occupational, and recreational. Results from the human health risk assessment indicated that no significant carcinogenic risks were present at the site for all future use scenarios. The risk assessment did indicate a slight non-carcinogenic risk for the residential scenario; however, residential housing is not an intended future land use for the site. Institutional controls, which restrict activities that may cause exposure to landfill waste, will also be adopted to limit future exposure.

Ecological Risks

Potential ecological risks were also assessed. The burrowing owl was chosen for evaluation due to potential risk resulting from inhalation of VOCs in their burrows. The evaluation indicated that the burrowing owl population within the area of the Site 22 landfill was healthy and that the chemical concentrations at the Site 22 landfill were not harmful to the burrowing owl community.

FEASIBILITY STUDY

A final Feasibility Study (FS) and an initial Proposed Plan were prepared in March 1999 to evaluate potential remedial alternatives that would prevent animals, namely ground squirrels, from burrowing into and exposing the buried refuse. The FS evaluated the proposed alternatives against nine criteria as required by the Superfund regulations. A description of the nine evaluation criteria is provided in Table 1. A summary of the alternatives evaluated in the March 1999 Final FS are presented in the following sections of this Proposed Plan.

TABLE 1. Evaluation Criteria for Superfund Remedial Alternatives
Overall Protection of Human Health and the Environment • determines whether an alternative eliminates, reduces, or controls threats to public health and the environment through institutional controls, engineering controls, or treatment.
Compliance with ARARs • evaluates whether the alternative meets Federal and State environmental statutes, regulations, and other requirements that pertain to the site, or whether a waiver is justified.
Long-term Effectiveness and Permanence • considers the ability of an alternative to maintain protection of human health and the environment over time.
Short-term Effectiveness • considers the length of time needed to implement an alternative and the risks the alternative poses to workers, residents, and the environment during implementation.
Reduction of Toxicity, Mobility, or Volume through Treatment • evaluates an alternative's use of treatment to reduce the harmful effects of principal contaminants, their ability to move in the environment, and the amount of contamination present.
Implementability • considers the technical and administrative feasibility of implementing the alternative, including factors such as the relative availability of goods and services.
Cost • includes estimated capital and annual operations and maintenance costs, as well as present worth cost. Present worth cost is the total cost of an alternative over time in terms of today's dollar value. Cost estimates are expected to be accurate with a range of +50 to –30 percent.
State/Support Agency Acceptance • considers whether the State agrees with the Navy and US EPA's analyses and recommendations, as described in the RI/FS and Proposed Plan.
Community Acceptance • considers whether the local community agrees with US EPA's analyses and preferred alternative. Comments received on the Proposed Plan are an important indicator of community acceptance.

It should be noted that a revised-final FS and corresponding Proposed Plan were prepared in May 1999. The revisions were made to address concerns raised by local agencies, and added squirrel abatement as an additional remedial alternative. However, after discussions with the regulatory agencies and the public, the Navy determined that this revision to the FS was infeasible. Therefore, the final March 1999 FS was retained as the FS of record for the Site 22 landfill.

REMEDIAL ACTION OBJECTIVES

The Remedial Action Objective (RAO) of this response action is to protect human health by preventing contact with landfill refuse. Since burrowing animals uncover refuse and humans (e.g., players, visitors, and workers at the golf course) could come in direct contact with exposed landfill refuse, the RAO is to eliminate this risk by preventing animals from burrowing into the Site 22 landfill and exposing the refuse. This will be accomplished through the use of physical barriers to permanently limit this exposure pathway to landfill refuse. The RAO complies with the NCP and Superfund requirements.

SUMMARY OF REMEDIAL ALTERNATIVES

Remedial alternatives for the Site 22 landfill are presented below. The alternatives are numbered to correspond with the numbers assigned in the final March 1999 FS. Four alternatives were evaluated as remedies for contamination at the Site 22 landfill. A brief summary of the four remedial alternatives is provided in Table 2.

Comment Elements

Many of these alternatives include common elements. Alternatives 2 and 3 include institutional controls, and groundwater and landfill gas monitoring. Institutional controls are restrictions on future land uses (e.g., deed restrictions, such as an easement or covenant) to limit the use of the property, thereby limiting potential exposure to contaminants. Consistent with expectations set out in the Superfund regulations, none of the remedies rely exclusively on institutional controls to achieve protectiveness. Groundwater will be monitored at the site boundaries. If monitoring shows that groundwater protection standards are exceeded in the future, the need for additional cleanup actions will be evaluated. Landfill gas concentrations at the site boundaries will also be monitored. If methane concentrations approach levels of concern, gas migration will be controlled.

TABLE 2. Summary of Remedial Alternatives for the Site 22 Landfill		
Medium	**RI/FS Designation**	**Description**
SOIL	Alternative 1	No action, groundwater monitoring, and gas monitoring
SOIL	Alternative 2	Installation of a biotic barrier, managing surface water flow, institutional controls, and groundwater and gas monitoring (preferred alternative)
SOIL	Alternative 3A	Multilayer cap with clay layer and biotic barrier, institutional controls, and groundwater and gas monitoring
SOIL	Alternative 3B	Multilayer cap with geosynthetic clay layer and biotic barrier, institutional controls, and groundwater and gas monitoring
SOIL	Alternative 4	Excavation and off-site disposal

It should be noted that cost estimates for all of the alternatives have been updated from those presented in the final May 1999 FS.

The burrowing owl, although not recently observed utilizing burrows in the area of proposed construction, will require relocation if found. Burrowing owls tend to inhabit abandoned ground squirrel holes. Remediation Alternatives 2 and 3 will involve installation and maintenance of a biotic barrier to limit intrusion by the burrowing of ground squirrels into the Site 22 landfill and will in turn prevent the presence of the burrowing owl habitat.

All alternatives, except the "no action" alternative, are expected to attain the RAOs.

Alternative 1 – No Action

Estimated Capital Cost: $2,000
Estimated Annual O&M Cost: $10,000
Estimated Present Worth Cost: $200,000

Alternative 1 provides a baseline against which other alternatives can be compared. Under this alternative, no cleanup action would be implemented. Regulations governing the Superfund program generally require that the "no action" alternative be evaluated generally to establish a baseline for comparison. In addition, the Navy/Marine Corps Installation Restoration Manual requires the Navy to consider the no-action baseline. Under this alternative, chemical concentrations in surrounding groundwater would be monitored, as would gas concentrations around the perimeter of the Site 22 landfill.

Minor construction costs would be incurred to install wells at site boundaries. Operation and maintenance (O&M) costs for monitoring would consist mainly of analytical costs. Monitoring would continue for 5 years and then site conditions would be reevaluated.

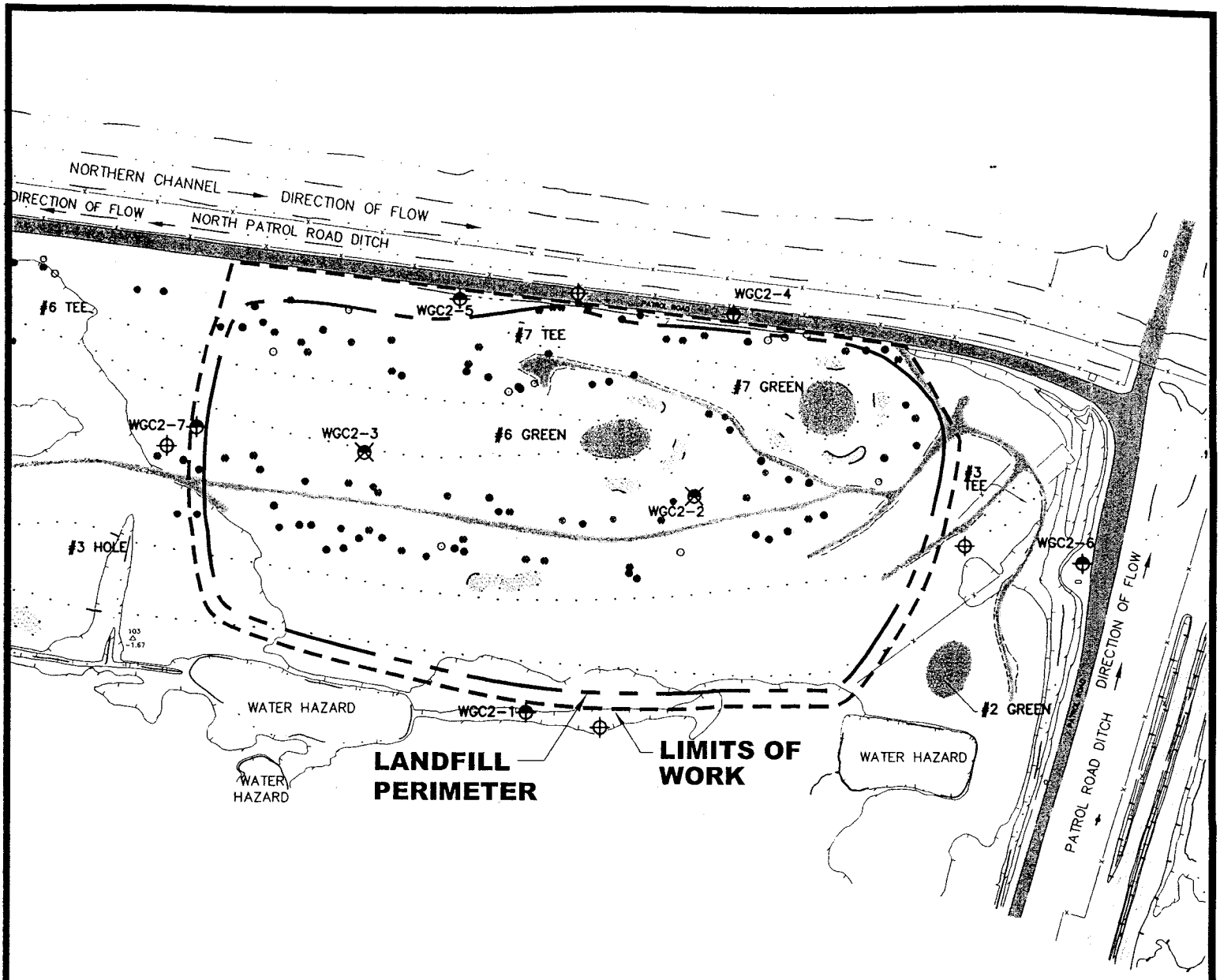
In this alternative, contaminants could be exposed by burrowing animals. Thus, this alternative is not protective of human health. This alternative can be easily implemented. The 30-year cost for Alternative 1 is estimated to be $200,000 (current landfill regulations require the Navy to monitor groundwater for 30 years).

Under this alternative, the Navy would take no action at the site to prevent exposure to the Site 22 landfill refuse. However, chemical concentrations in groundwater and landfill gas around the perimeter of the site would continue to be monitored.

Alternative 2 – Biotic Barrier [Preferred Alternative]

Estimated Capital Cost: $1,415,000
Estimated Annual O&M Cost: $21,000
Estimated Present Worth Cost: $1,835,000

Alternative 2 consists of a biotic barrier, layers constructed of soil, gravel, cement, and cobblestone to prevent animals from burrowing into the Site 22 landfill. It also includes institutional controls, and groundwater and gas monitoring as shown in Figure 3, Site Plan. With the biotic barrier, Alternative 2 would achieve the overall objective of preventing human exposure to contaminants by impeding burrowing of animals and disruption of landfill refuse. Ground squirrels typically burrow only into low maintenance or low activity grassy areas, where golf play does not occur. Therefore, the biotic barrier would be installed on the seven acres of the Site 22 landfill not directly associated with the golf course activities (field of play) as shown in Figure 4, Construction Sequential Plan. Alternative 2 will require these areas of the Site 22 landfill to be re-contoured to accommodate 18 inches of biotic barrier material and fill to prevent ponding of water on the Site 22 landfill and to enhance precipitation runoff in order to reduce water infiltration into the Site 22



LEGEND

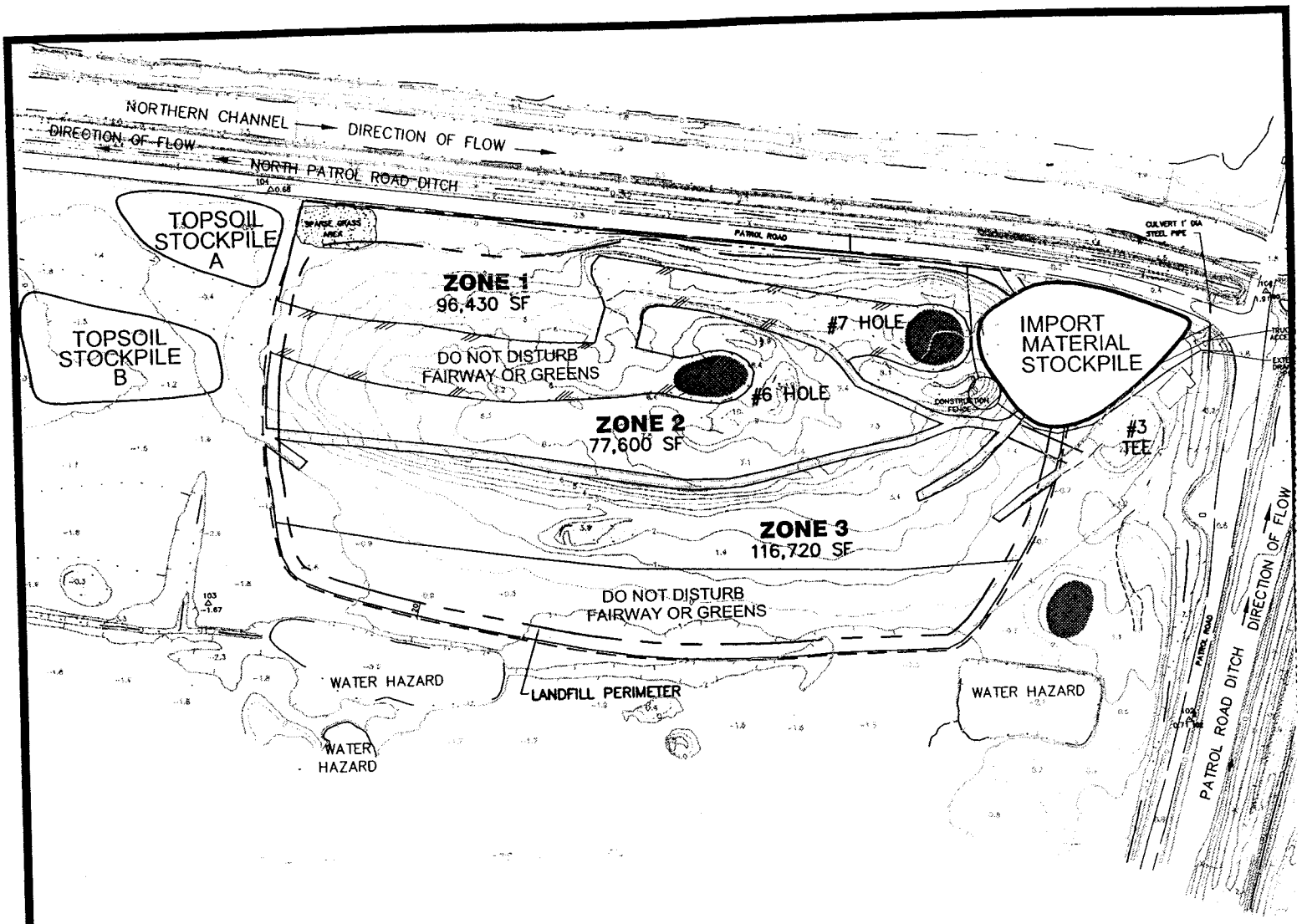
- LIMITS OF WORK
- LANDFILL PERIMETER
- FENCE
- WATERLINE
- PAVED ROAD
- TREES
- GOLF CART/MAINTENANCE ROAD
- FAIRWAY
- 5 EXISTING GROUNDWATER MONITORING WELLS
- 2 GROUNDWATER MONITORING WELLS TO ABANDON
- 4 PROPOSED GAS MONITORING WELLS
- SAND-TRAPS

N

200' 0 200'

SCALE:1" = 200'

FIGURE 3
SITE PLAN

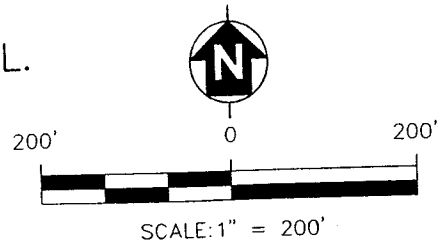


CONSTRUCTION SEQUENCE

ZONE 1: REMOVE ONE FOOT OF CLEAN TOPSOIL AND PLACE IN STOCKPILE "A" (ESTIMATE 4,500 CY), PLACE BIOTIC BARRIER AND REPLACE TOPSOIL.

ZONE 2: NO REMOVAL OF TOPSOIL, PLACE BIOTIC BARRIER AND ADD ONE FOOT OF TOPSOIL.

ZONE 3: REMOVE ONE FOOT OF CLEAN TOPSOIL AND PLACE IN STOCKPILE "B" (ESTIMATE 5,500 CY), PLACE BIOTIC BARRIER AND REPLACE TOPSOIL.



NOTE:

SOIL PLACED IN STOCKPILES A AND B WILL CONSIST OF TOPSOIL AND MULCHED VEGETATION. THE MATERIAL WILL BE TESTED FOR GEOTECHNICAL PARAMETERS AND APPROPRIATE CHEMICAL PARAMETERS TO DETERMINE ITS SUITABILITY FOR USE AS EITHER FILL/FOUNDATION MATERIAL OR AS SOIL TO SUPPORT VEGETATIVE COVER.

FIGURE 4
CONSTRUCTION
SEQUENTIAL PLAN

landfill. Since leaving existing trees in place would create a small gap in the biotic barrier around the base of the trees, most of the trees will be removed in the Site 22 area under this alternative. It is noted that most of these trees (such as eucalyptus) are not native to the area.

Alternative 2 provides a permanent remedial solution, although some future O&M activities would be required. The alternative is also implementable; that is, it can be built easily using standard construction material, equipment, and methods. Construction equipment and construction personnel are available in the area. The biotic barrier will be constructed as shown in Figure 5, Cover Detail.

The present worth 30-year cost for Alternative 2 is estimated at $1,835,000. The majority of costs will be associated with clearing seven acres of trees, 9,000 cubic yards of topsoil stockpiling, import of 1,000 truckloads of stone material for the biotic barrier, and 150 truckloads of slurry cement placement on the biotic barrier stone material. All of these truckloads will be importing clean materials and will be moved in accordance with a transportation plan to be developed as part of the remedial design. Other costs will include installation of four new landfill gas monitoring wells and abandonment of two existing groundwater monitoring wells along with O&M. O&M costs for monitoring would consist mainly of analytical costs, and costs for implementation of institutional controls would be minimal.

Alternative 3 – Multilayer Cap

Estimated Capital Cost: $3,490,000
Estimated Annual O&M Cost: $31,000
Estimated Present Worth Cost: $4,105,000

Alternative 3 consists of a multilayer cap over the entire 9.4 acres of the Site 22 landfill, institutional controls, and groundwater and gas monitoring. The following functional components, from top to bottom, are included:

- A minimum 6-inch thick erosion control layer that supports vegetation and, thus, protects the layer below from erosion, drying, and cracking. The vegetation would allow the surface of the Site 22 landfill to continue to be used as a golf course (as would all other alternatives).
- A biotic barrier constructed of soil or rock would also be included to prevent burrowing animals from penetrating the low-permeability layer.
- A minimum 12-inch thick barrier or low-permeability layer that reduces the infiltration of precipitation into the Site 22 landfill, which would be constructed as either a compacted clay layer (Alternative 3A) or by placing a geosynthetic clay liner (Alternative 3B).
- A minimum 24-inch thick foundation layer constructed of inert material.

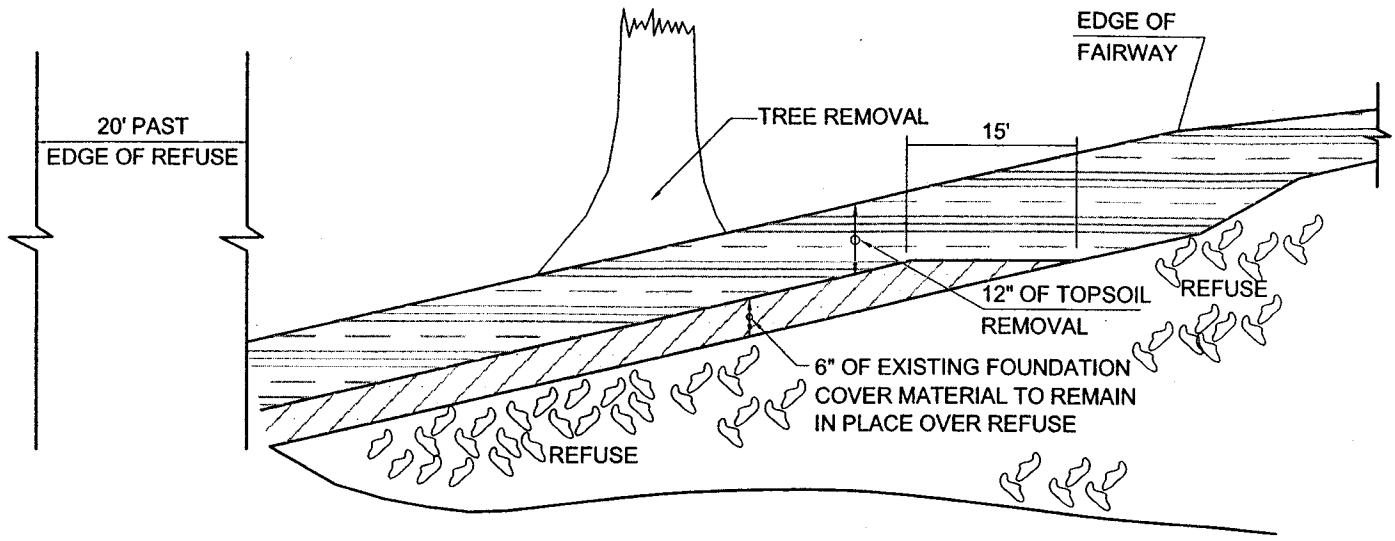
Both Alternatives 3A and 3B would involve re-grading of the surface of the Site 22 landfill to prevent ponding and facilitate surface drainage, and they would also include landfill gas and groundwater monitoring, and long-term O&M of the multilayer cap.

Both Alternatives 3A and 3B are considered effective to achieve overall protection of human health by eliminating direct contact with contaminants. They would also achieve additional protection of groundwater by reducing the infiltration of precipitation into the Site 22 landfill. These alternatives would provide a permanent solution to remediate the site although a small amount of future, long-term O&M would be required.

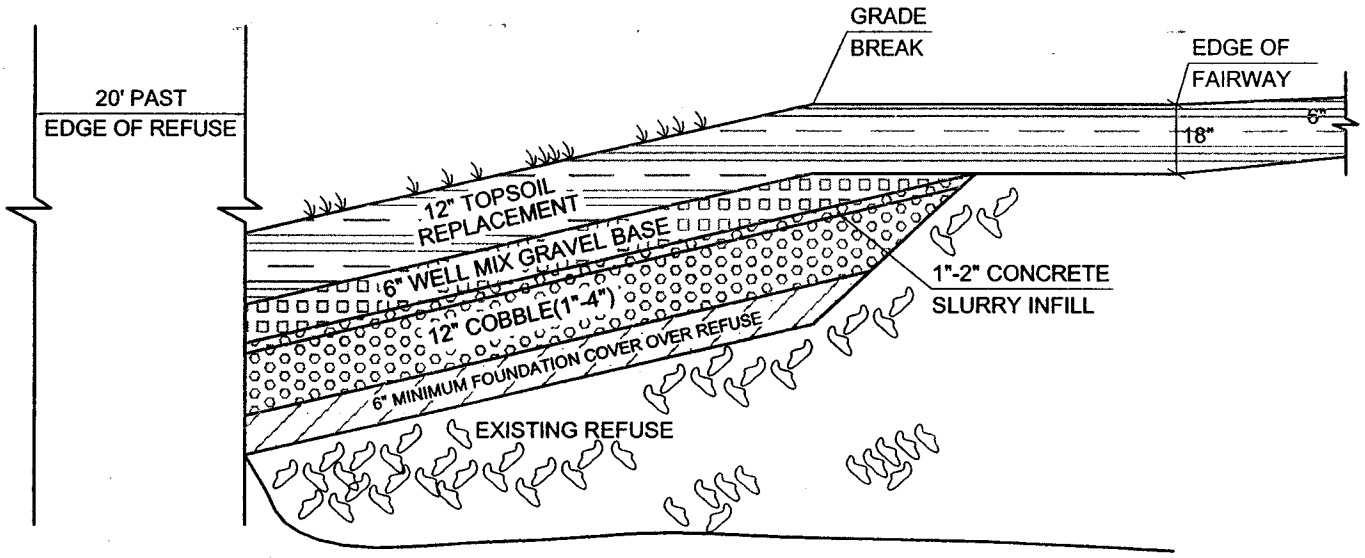
Both Alternatives 3A and 3B would be relatively easy to implement. Construction materials would include soil for the vegetative cover, biotic barrier, and either clay or the geosynthetic clay liner and drainage layer components. The materials for the cap, specifically soil and clay, would likely be available within 20 miles of Moffett Field. Implementation of Alternatives 3A and 3B would cause major changes in landscaping and the aesthetics of the golf course. All trees and shrubs at Site 22 would be removed and not replaced since these deep-rooted plants could damage the low-permeability layer and would interfere with operation of cap construction equipment.

The present worth 30-year cost is $4,105,000 for Alternative 3A and $3,790,000 for Alternative 3B. The majority of the costs are associated with cap materials and construction. Capital costs are primarily related to sources of earth materials and hauling.

Construction costs would include equipment and labor. Other costs would include gas and groundwater monitoring and O&M costs, and costs associated with institutional controls. O&M costs for monitoring would consist mainly of analytical costs, and costs for implementation of institutional controls would be minimal.



TYPICAL SOIL REMOVAL



PROPOSED BIOTIC BARRIER COVER

FIGURE 5
COVER DETAIL

Alternative 4 – Excavation and Off-Site Disposal

Estimated Capital Cost: $6,500,000
(Average Range Cost)
Estimated Annual O&M Cost: $10,000
Estimated Present Worth Cost: $6,550,000

Alternative 4 involves excavating refuse within the Site 22 landfill and disposing of it off site at another landfill. The soil and refuse layer would be removed, and clean soil would be used to fill the depression left after the refuse was removed. With Alternative 4, only limited post-action monitoring would be required, and there would be no institutional controls to limit future land use.

This alternative is effective and it would achieve the objective of protecting human health by essentially removing all contaminated material from the site.

Alternative 4 would be readily implementable. The excavation techniques that would be needed are common and easily available. Implementation of Alternative 4 would, however, cause major changes in the topography and aesthetics of the golf course. Once the refuse is excavated, the depression would be filled, but would not return the Site 22 landfill to its current contours. In addition, a large number of mature trees and shrubs at the Site 22 landfill would be removed, but could be replaced after excavation.

The cost of implementing Alternative 4 at Site 22 ranges from $4,000,000 to $9,000,000 (average 6,500,000) depending on the disposal site and soil source locations selected. Capital costs are primarily related to waste hauling and disposal, and acquiring fill material. Local soil sources and permitted disposal units are assumed to be available so that hauling costs can be minimized. Additional costs would be associated with post-action contouring and soil testing as well as a minimum of 3 years of groundwater monitoring.

EVALUATION OF ALTERNATIVES

Nine criteria are used to evaluate the remediation alternatives individually and against each other in order to select a remedy. A description of the nine evaluation criteria is provided in Table 1. This section of the Proposed Plan profiles the relative performance of each alternative against seven of the nine criteria, noting how it compares to the other options under consideration. The other two criteria, state/support agency and community acceptance, will be evaluated after the public comment period. Seven of the nine evaluation criteria are discussed below. The "Detailed Analysis of Alternatives" can be found in the FS.

1. Overall Protection of Human Health and the Environment

Alternative 1 (No Action) would not protect human health and the environment because landfill refuse would not be isolated. For this reason, Alternative 1 is not considered further in this analysis as an option for this site. Alternatives 2 and 3 would protect human health and the environment by providing a barrier to restrict burrowing animals from mobilizing contaminants to the surface. Alternative 4 would protect human health and the environment by removing the contaminated material completely.

From this aspect of the comparison, Alternatives 2 and 3 are considered acceptable because they adequately address the identified RAO for the site (preventing animals from burrowing into the Site 22 landfill and exposing the refuse). Alternative 4 is regarded as most favorable, because contaminant mass is removed.

2. Compliance with ARARs

Applicable Relevant and Appropriate Requirements (ARARs) from federal and state laws and regulations were evaluated for each alternative. The evaluation considered chemical-specific, location-specific, and action-specific ARARs. It was determined that chemical-specific ARARs do not exist for landfill refuse and none were applicable for the surrounding groundwater. All the alternatives would meet the location-specific ARARs (including the Coastal Zone Management Act and the Migratory Bird Treaty Act).

The groundwater monitoring regulations in 27 CCR, Subchapter 3 are considered relevant and appropriate and can be met by the Preferred Alternative. However, the Title 27 CCR landfill closure regulations and the RCRA Subtitle D landfill closure requirements, as evaluated in the FS, are not relevant and appropriate to the Preferred Alternative or to the other alternatives evaluated because a significant amount of refuse is buried below the groundwater table. Although this prevents effective implementation of the landfill closure requirements for minimizing infiltration of water to the waste and generation of leachate, leachate is not a significant concern for the site as only minimal impacts to groundwater have been detected outside of the site boundaries. In addition, as described in the risk

assessment, groundwater in the area is not of beneficial use due to high salinity.

3. Long-Term Effectiveness and Permanence

Alternatives 2, 3A, and 3B would provide long-term effectiveness but would require long-term O&M activities. These would include gas and groundwater monitoring and occasional repairs, such as regrading to ensure that the design thickness of the soil cover(s) is maintained. Alternative 4 provides a long-term, permanent solution by removing the refuse with no further cleanup activity.

From this aspect of the comparison of alternatives, Alternative 4 is regarded as the most favorable. Alternatives 2 and 3 are also regarded as acceptable.

4. Short-Term Effectiveness

Alternative 2 would provide greater short-term effectiveness than Alternatives 3 and 4 because Alternatives 3 and 4 would require more time to implement both due to the larger volumes of materials required and the more complex installation, construction, and excavation involved. The requirement for more materials for Alternatives 3 and 4 would also result in greater truck traffic and, therefore, increase the potential for vehicle accidents, dust, and noise disturbances. In addition, since Alternative 4 involves excavation and removal of the waste material, the potential for short-term exposure to contaminants is greatest for this alternative.

Alternative 2 can also be constructed with fewer disturbances to site vegetation and surface topography. This is mainly because the biotic barrier that is proposed in Alternative 2 would cover less area than the caps specified in Alternatives 3A and 3B, and excavation as required under Alternative 4. Ultimately, however, the degrees to which Alternatives 2, 3A and 3B cause disturbances to golf course aesthetics would be roughly equal. Alternative 4 would remove the existing contours that are created by the mounds at the Site 22 landfill, though it would also allow for the replacement of trees.

In consideration of the above factors, from this aspect of the comparison, Alternative 2 is regarded as the most favorable.

5. Reduction of Toxicity, Mobility, or Volume through Treatment

Based on US EPA guidance "Conducting Remedial Investigations and Feasibility Studies for CERCLA Municipal Landfill Sites," February 1991, this criterion is not considered relevant to municipal landfills. Treatment is not deemed to be practical or technically feasible for landfill sites. Therefore, none of the alternatives considered and evaluated for the Site 22 landfill include a treatment component. Consequently, no further evaluation of the alternatives under this criterion was conducted. It is noted, however, that the Alternatives 2, 3A, and 3B are all effective in reducing contaminant mobility through isolation. Alternative 4 is also effective in reducing contaminant mobility and volume since all of the landfill materials would be removed from the site.

6. Implementability

Alternative 2 is easier to implement than Alternatives 3A, 3B, and 4. Alternative 2 requires the least amount of equipment and materials for the barrier.

Both Alternatives 3A and 3B require significantly more construction materials including soil, drainage layer material, and clay or other suitable material to construct the earthen liner or a geosynthetic clay liner.

Alternative 4 is more complicated to implement than Alternatives 2 and 3 for several reasons. Alternative 4 would require that equipment and workers come into contact with refuse, necessitating more complicated health and safety procedures than required for the other alternatives. Large volumes of refuse would be transported on public roads to an approved disposal facility. This alternative would also require significantly more volume of material to be placed at the Site 22 landfill than the other alternatives.

From this aspect of the comparison of the alternatives, Alternative 2 can be implemented more readily than Alternatives 3A and 3B, and, therefore, is regarded as the most favorable. Alternative 4 is regarded as the least favorable.

7. Cost

Alternative 2 has the lowest construction costs. Costs for groundwater and gas monitoring are identical for Alternatives 2, 3A, and 3B. Alternative 3B is less expensive than Alternative 3A because of the different materials used in the cap structure. Alternative 4 incurs a much higher capital cost than all the other alternatives because it involves hauling a large amount of material to and from the Site 22 landfill. However, Alternative 4 would not need

maintenance and only limited long-term groundwater monitoring.

From this aspect of cost comparison of alternatives, Alternative 2 is regarded as the most favorable, while Alternative 4 is regarded as the least favorable.

SUMMARY OF COMPARISON

Table 3 summarizes the comparative evaluation of the alternatives presented above:

SUMMARY OF THE PREFERRED ALTERNATIVE

The preferred alternative for cleaning up the Site 22 landfill is Alternative 2, the biotic barrier. This alternative consists of a biotic barrier comprised of layers constructed of soil, gravel, concrete slurry, and cobblestone to prevent animals from burrowing into the Site 22 landfill. It also includes institutional controls, as well as groundwater and gas monitoring. It is noted that construction of the barrier only involves disturbances to "rough" areas of the golf course, and that any disturbed areas will be restored to the extent practicable.

The potential human health risks at the Site 22 landfill are caused by direct contact with landfill refuse. With the biotic barrier, Alternative 2 will achieve the general RAO of protecting human health by minimizing contact with landfill refuse through the prevention of animal burrowing, which would otherwise cause mobilization of refuse to the surface. This alternative is recommended because it will meet the overall objective of the remediation (i.e., to reduce human health risk at a cost less than the other alternatives). Hence, the Preferred Alternative (1) reduces risk within a reasonable timeframe, (2) meets ARARs from federal and state laws and regulations, (3) is less costly than Alternatives 3 or 4, and (4) provides for long-term reliability of the remedy.

Based on the information available at this time, the Navy, US EPA, and the RWQCB believe Alternative 2 (biotic barrier, surface water controls, institutional controls, and groundwater and gas monitoring) would be protective of human health and the environment, would comply with ARARs, would be cost-effective, and would utilize permanent solutions to the maximum extent practicable. The Preferred Alternative can change in response to public comments or new information.

TABLE 3. Comparative Evaluation of the Remedial Alternatives

Evaluation Criteria	Alternative 1 No action	Alternative 2 Biotic barrier (preferred alternative)	Alternative 3A Multilayer cap with clay layer and biotic barrier	Alternative 3B Multilayer cap with geosynthetic clay layer and biotic barrier	Alternative 4 Excavation and off-site disposal
Overall Protection of Human Health and the Environment	Not Protective	Acceptable	Acceptable	Acceptable	Most Favorable
Compliance with ARARs	Not Evaluated	Acceptable	Acceptable	Acceptable	Acceptable
Long-Term Effectiveness and Permanence	Not Evaluated	Acceptable	Acceptable	Acceptable	Most Favorable
Short-Term Effectiveness	Not Evaluated	Most Favorable	Acceptable	Acceptable	Least Favorable
Reduction of Toxicity, Mobility, or Volume through Treatment	Not Evaluated	Not Evaluated	Not Evaluated	Not Evaluated	Not Evaluated
Implementability	Not Evaluated	Most Favorable	Acceptable	Acceptable	Least Favorable
Cost	Not Evaluated	Most Favorable	Acceptable	Acceptable	Least Favorable

Note: Alternatives 2, 3A, 3B, and 4 include institutional controls, and groundwater and gas monitoring.

GLOSSARY OF TERMS

Specialized terms used in the Proposed Plan are defined below:

Administrative Record - all documents containing information the government uses to (1) select response actions, and (2) impose administrative sanctions for violations of CERCLA. This paper trail includes at a minimum: correspondence, the RI/FS, the Proposed Plan, the ROD, and public comments.

Applicable Relevant and Appropriate Requirements (ARARs) – ARARs include the federal standards and more stringent state standards that are legally applicable or relevant and appropriate under the circumstances. ARARs include cleanup standards, standards of control, and other environmental protection requirements, criteria, or limitations.

Biotic Barrier – Either a natural or synthetic layer placed to prevent animals from burrowing into the soil below.

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA or Superfund) – a law that establishes a program to identify hazardous waste sites and establish procedures for cleaning up sites to be protective of human health and the environment, and evaluate damages to natural resources.

Cleanup – Actions taken to deal with a release or threat of a hazardous substance that could affect people or the environment. The term "cleanup" is sometimes used interchangeably with the terms remedial action, remedy, or remediation.

Cost-Effective Alternative – An alternative control or corrective method identified after analysis as the best available in terms of reliability, permanence, and economics. Although costs are an important consideration, when regulatory and compliance methods are being considered, the analysis does not require the Navy, US EPA, and the RWQCB to choose the least expensive alternative.

Exposure Pathways – the way a chemical or physical agent comes in contact with living organisms.

Federal Facilities Agreement (FFA) – an agreement signed by the Navy, the US EPA, the RWQCB, and the DTSC that sets forth the actions and schedule the Navy is expected to meet to address environmental contamination at Moffett Field.

Feasibility Study (FS) – a study to identify, screen, and compare alternatives for a site cleanup.

Geosynthetic Clay Liner – a liner consisting of a thin layer of clay sandwiched between plastic fabric that acts as a barrier to limit the amount of water entering the soil below.

Groundwater – water present below the ground surface in saturated bedrock or sediment that can be recovered in a well.

Groundwater Protection Standards – chemical concentrations limits in groundwater that should not be exceeded. The limits are based on current and future uses of groundwater, existing groundwater quality, and potential adverse effects to human health and the environment.

Institutional Controls – restrictions on land use that limit activities, such as building or drilling wells.

Leachate – a liquid that results from water collecting contaminants as it trickles through wastes. Leaching may occur in farming areas, feedlots, and landfills, and may result in hazardous substances entering surface water, groundwater, or soil.

Lead Agency – the federal or state agency providing the On-Scene Coordinator (OSC) or the responsible official for a CERCLA response action.

Methane – a colorless, odorless, explosive gas generated by decomposing refuse.

National Contingency Plan (NCP) – the basic regulatory directive for federal response actions under CERCLA.

Oxygen Deficient Atmosphere – an atmosphere where oxygen has been displaced by gases not containing oxygen.

Polychlorinated biphenyls (PCBs) – a toxic chemical formerly used in transformer oils to keep them cool.

Permeability – a property of soil that indicates how easily fluids, like water, can flow through a soil.

Preferred Alternative – the remedial alternative selected by the lead agency, in conjunction with the support agencies, that best satisfies the RAO, based on the evaluation of alternatives presented in the FS.

Proposed Plan – a document that reviews the cleanup alternatives presented in the feasibility study, summarizes the recommended cleanup actions, explains the reasons for recommending them, and solicits comments from the community.

Record of Decision (ROD) – a decision document that identifies the cleanup alternative chosen for implementation at a Superfund site. The ROD is based on information from the remedial investigation and feasibility study and on public comments and community concerns.

Receptor – a representative human or animal that is used in evaluating health risks. For example, when evaluating the human health risks for an occupational scenario, a construction worker is the hypothetical receptor.

Regional Water Quality Control Board (RWQCB) – an environmental regulatory agency supporting the US EPA with oversight of environmental restoration activities at Moffett Field.

Remedial Action Objective (RAO) – the objective that the proposed site cleanup is expected to accomplish.

Remedial Investigation (RI) – an investigation during which the types, amounts, and locations of contamination at a site are identified.

Risk Assessment – an analysis of the potential negative human health and environmental effects caused by hazardous substances released from a site without environmental controls.

Semivolatile Organic Compound (SVOC) – organic compounds (carbon-containing), such as certain oils and pesticides, that do not evaporate readily at room temperature.

Superfund – is the common name for CERCLA, which was a law passed in 1980 that set forth the process for investigation and cleanup of environmentally contaminated sites. Refers to a fund of dollars via a tax on oil and gas industries.

Total Petroleum Hydrocarbon (TPH) – Organic compounds that are either fuel or components of fuel.

U.S Environmental Protection Agency (US EPA) – the lead regulatory agency providing oversight of the environmental restoration activities at Moffett Field.

Volatile Organic Compound (VOC) – organic compounds, such as dry-cleaning solutions or degreasing solvents, that evaporate readily at room temperature.

FOR MORE INFORMATION

If you have any questions about the Moffett Federal Airfield Site 22 Landfill, please contact:

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COMMUNITY PARTICIPATION

The Navy, US EPA, and the RWQCB provide information regarding the cleanup of the Site 22 Landfill to the public through public meetings, the Administrative Record file for the site, and announcements published in the San Jose Mercury News. The Navy, US EPA, and the RWQCB encourage the public to gain a more comprehensive understanding of the site and the Superfund activities that have been conducted at Moffett Federal Airfield.

The dates for the public comment period; the date, location, and time of the public meeting; and the locations of the Administrative Record files, are provided on the front page of this Proposed Plan.

There are two ways for you to provide your comments during the public comment period between April 2, 2001 and May 9, 2001. You may utilize the attached comment form to send written comments to the address listed below and included on the comment form:

Ms. Andrea Muckerman, BRAC Environmental Coordinator
Southwest Division Naval Facilities Engineering Command
1220 Pacific Highway, Code 06CH.AM
San Diego, CA 92132-5190
Telephone: (619) 532-0911
Fax: (619) 532-0995
e-mail: muckermanam@efdsw.navfac.navy.mil

Alternatively, you may submit your comments during the public meeting on April 26, 2001 at the Mountain View City Council Chambers. A court reporter will be at the meeting to record public comments.

After the public comment period is over, the Navy, US EPA, and RWQCB will review and consider the submitted comments before making a final decision on the remedial action alternative to be used at the site. A Responsiveness Summary documenting the comments received during the public comment period and public meeting, and stating the Navy's response to the comments will be prepared and sent to all of the commentors. The Responsiveness Summary will also be added to the information repository for the Site. All site-related documents are available for review at the Mountain View Public Library.

Mountain View Public Library
585 Franklin Street
Mountain View, California 94041
Contact: Reference Desk
Monday - Thursday 10:00 a.m. to 9:00 p.m.
Friday and Saturday 10:00 a.m. to 6:00 p.m.
Sunday 1:00 p.m. to 5:00 p.m.

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INSIDE:
Proposed Cleanup Plan for
Moffett Field Site 22
Golf Course Landfill

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Moffett Federal Airfield Superfund Site

The U.S. Navy, in cooperation with the U.S. Environmental Protection Agency (US EPA), and the San Francisco Bay Regional Water Quality Control Board (RWQCB), is soliciting public comments on several proposed actions considered to remedy a landfill at former Naval Air Station, Moffett Field (Moffett Field).

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